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Appendix B: LVS® 95XX Understanding the Standards

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GS1 Solution Partner

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Understanding the Standards

Four types of standards or specifications are used to regulate the verification of barcode print quality:

1. Verification Methodology
2. Verifier Conformance Specification
3. Application Standards
4. Symbology Specification Standards

Each of the aforementioned areas is designed to interact with each other. For example, the Verifier Conformance Standards will use the rules stated for the Verification Methodology. The individual Symbology Specification Standards define the rules for printing the symbology and are all designed to be tested with the Verifier Conformance Specifications. The Application Standards will apply the rules for barcode quality as determined by those Verifier Conformance Specifications along with certain “industry specific” variations to the rules.

Verification Methodology

Verification Methodology is a method of measurement used to determine the quality of a barcode image in relation to its intended use; this means that measurements of quality have to be made as if the barcode was being read by a handheld wand, laser reader or charge-coupled device (CCD).

In the past, the European Verification Standard was called EN 1635 and the American equivalent standard was called ANSI X3.182-1990. There were some differences between the two standards, but very little. Today, Europe and America have combined their methodology standards for barcodes to one international standard called ISO/IEC 15416:2000(E).

The world of barcoding is divided into two sections: linear symbols and two-dimensional (2D) (for example, PDF, Data Matrix, etc.) symbols.

- ISO/IEC 15416:2000 (E) is for linear symbols
- ISO/IEC FDIS 15415:2011 is for 2D symbols

The Verifier Conformance Standard for verification of linear barcodes is ISO/IEC 15426-1:2006(E). For two-dimensional barcode symbols, the International Standard document identification is ISO/IEC 15426-2:2005(E).

These standards list and define various measurements of barcode reflectance values to determine the quality of a label. All certified verifiers must conform to these standards.

Application Standards

Application Standards are defined as a set of recommendations governing the size, shape, positioning, and formatting of a barcode image used within a specific job function; these different job functions are called “Applications.” Various industries have their own set of Application Standards, such as military, medical, trucking, retail, etc. Examples of these include the following:

Industry	Application Standard
EAN/UCC General Specifications	GenSpecs
Military Standards	MIL-STD-130L
UID Guidelines	Part of Mil-Spec-130L
Air Transport Association	ATA SPEC 2000
EAN/UPC National Drug Code	NDC 2001
Packaging Industry	ISO 15394:2000(E)

When a specific Application Standard is not specified, ISO/IEC 15415/15416 Specifications are to be used.

An Application Standard always overrides the ISO standard.

ISO/IEC 15415/15416 Specifications

The ISO/IEC 15416:2000(E) International Standard refers to a publication that outlines how to assess barcode quality for linear symbols. The International Standard for two-dimensional symbols is outlined in ISO/IEC 15415:2011.

According to this International Specification, the following measurements are determined:

- Edge Determination
- Minimum Reflectance
- Symbol Contrast
- Minimum Edge Contrast
- Modulation, Defects (Spots and Voids)
- Quiet Zone
- Decode
- Decodability

A minimum of 10 scan lines are required to determine an overall grade average. With the LVS-95XX, a typical 100% UPC/EAN barcode will be scanned over 400 times in different positions within the height of the barcode image.

The reading station is calibrated to the ISO/IEC standards by using the included NIST traceable EAN/UPC Calibrated Conformance Standard Test Card. A Letter of Authenticity is supplied with each Calibration Label.

For two-dimensional (2D) barcodes (RSS-Composite, Data Matrix - *ECC-200 only*, PDF417, and others) a different set of parameters are measured according to the specifications titled ISO/IEC FDIS 15415:2011 and in accordance with ISO/IEC FDIS 15426-2 verification standards. These parameters depend upon the symbology and are defined in the applicable barcode symbology specification.

General UCC/EAN Application Specifications (Gen Specs)

The General UCC/EAN Application Specifications guidelines can be found in the *General EAN.UCC Specifications* publication in section 5.4.

Gen Specs state that ISO/IEC 15415/15416 Specifications are to be followed along with the following variations:

Variation	Description
Variation 1	There is a slight difference in what aperture size is to be used. An aperture size determines the effective sample area of the bars and spaces.
Variation 2	The minimum barcode quality must be a 1.5 Grade Point Average unless an ITF-14 greater than 0.63 mm (25 mils) is used, in which case a .5 Grade Point Average is acceptable.
Variation 3	Barcode height is not specified in the ISO standards. However, the Gen Specs clearly state that no barcode will be truncated less than the stated application specification.
Variation 4	Human Readable interpretation is excluded from the ISO standards; Gen Specs state that they must be present.